Amendments to the Claims

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

1. (original) A capacitive sensor for measuring a stimulus parameter, the sensor comprising:
   a circuit board including at least one metallic layer;
   a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form a transducer capacitor characterized by a capacitance, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in the stimulus parameter, whereby the capacitance changes in accordance with the change in the stimulus parameter; and
   an oscillator circuit including a low-pass filter and coupled to the transducer capacitor, the oscillator circuit being configured to generate a filtered signal characterized by a frequency, whereby the frequency changes in accordance with capacitance changes.

2. (original) The sensor of claim 1, wherein the metallic diaphragm becomes substantially curved in response to the stimulus parameter.

3. (original) The sensor of claim 1 further comprising:
   a conductive ring disposed between the metallic diaphragm and the circuit board; and
   a pressure port assembly coupled to the conductive ring, whereby a cavity is formed between a pressure port and the metallic diaphragm.

4. (previously presented) The sensor of claim 3, wherein the pressure port assembly further comprises:
   a cap coupled to the conductive ring; and

a compressible sealer element disposed between the snap-on cap and the metallic diaphragm, whereby substantially symmetrical forces are applied to the metallic diaphragm to thereby seal the cavity.

5. (original) The sensor of claim 4, wherein the compressible sealer element has a substantially rectangular cross-section.

6. (original) The sensor of claim 4, wherein the compressible sealer element includes an o-ring.

7. (original) The sensor of claim 3, wherein the circuit board includes a metallic land disposed between the conductive ring and the circuit board, the metallic land being adapted to support the conductive ring.

8. (original) The sensor of claim 7, wherein the metallic land is co-planar with the at least one metallic layer.

9. (original) The sensor of claim 1, wherein the circuit board includes at least one guard ring disposed within a thickness of the circuit board, the guard ring being adapted to reduce stray capacitance between the metallic diaphragm and the metallic layer.

10. (original) The sensor of claim 9, wherein the at least one guard ring mitigates the effects of sensor performance variations due to temperature induced variations of a dielectric constant of the circuit board.

11. (original) The sensor of claim 1, wherein the low-pass filter includes an impedance element coupled to a first shunt capacitor.

12. (original) The sensor of claim 11, wherein the impedance element includes a resistor, or an inductor, or both.

13. (original) The sensor of claim 11, wherein the first shunt capacitor is coupled to AC ground.

14. (original) The sensor of claim 11, wherein the low-pass filter is connected to the input of the transducer capacitor.

15. (original) The sensor of claim 11, further comprising a second capacitor disposed between the transducer capacitor and AC ground to form a voltage divider.

16. (previously presented) The sensor of claim 11, wherein the low-pass filter includes a series impedance element coupled to the input of the transducer, and a capacitor disposed between an output of the transducer and AC ground to thereby form a voltage divider.

17. (original) The sensor of claim 16, wherein the series impedance element includes resistor, or an inductor, or both.

18. (original) The sensor of claim 17, wherein the second capacitor forms a capacitance divider with an inter-plate capacitance generated between the metallic diaphragm and the metallic layer.

19. (original) The sensor of claim 18, wherein the capacitance divider is configured to reduce diode conduction within an input circuit of the oscillator.

20. (original) The sensor of claim 1, wherein the metallic diaphragm does not include an attached metallic plate.

21. (original) A capacitive sensor for measuring a stimulus parameter, the sensor comprising:

A capacitor transducer including at least one fixed plate member, the capacitor transducer being characterized by a variable capacitance, whereby the variable capacitance varies in accordance with a change in the stimulus parameter; and

an oscillator circuit coupled to the capacitor transducer, the oscillator circuit including a low-pass filter coupled to an input of the capacitive transducer, the oscillator

circuit generating a non-sinusoidal signal having a frequency, whereby the frequency is proportional to the stimulus parameter.

22. (original) The sensor of claim 21, further comprising:

a first circuit loop disposed in series with the capacitor transducer, the first circuit loop providing a non-inverting gain to the filtered signal; and

a second circuit loop disposed in parallel with the capacitor transducer, the second circuit loop providing an inverting gain to the filtered signal.

23. (previously presented) The sensor of claim 21, wherein the environmental parameter is fluid pressure.

24. (original) The sensor of claim 23, further comprising:

a circuit board including at least one metallic layer; and

a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form the variable capacitor transducer, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in the fluid pressure, whereby the variable capacitance changes in accordance with the change in the fluid pressure.

25. (original) The sensor of claim 24, further comprising a first capacitor coupled to the transducer capacitor to thereby form a capacitance divider with an inter-plate capacitance generated between the fixed plate member and a variable plate member.

26. (original) The sensor of claim 21, wherein the low-pass filter includes a shunt capacitor and a resistor.

27. (original) The sensor of claim 21, wherein the stimulus parameter is pressure.

28. (original) The sensor of claim 21, wherein the stimulus parameter is force.

29. (original) The sensor of claim 21, wherein the stimulus parameter is displacement.

30. (original) The sensor of claim 21, wherein the stimulus parameter is humidity.

31. (original) A capacitive sensor system for measuring a stimulus parameter, the system comprising:

a circuit board including at least one metallic layer disposed therein;

a metallic diaphragm coupled to the circuit board to thereby form a variable capacitor, the variable capacitor being characterized by a variable capacitance, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in a stimulus parameter, such that the capacitance is varied in accordance with stimulus parameter changes;

an oscillator circuit disposed on the circuit board and coupled to the variable capacitor, the oscillator circuit including a low-pass filter configured to generate a filtered signal characterized by a frequency that changes in accordance with the capacitance; and

a processor coupled to the oscillator circuit, the processing circuit being configured to derive a value of the stimulus parameter from the frequency.

32. (original) The system of claim 31, wherein the at least one metallic layer includes two co-planar rings disposed on a surface of the circuit board.

33. (original) The system of claim 32, wherein the metallic diaphragm is grounded.

34. (original) The system of claim 32, wherein the two co-planar rings are inter-digitated.

35. (original) The system of claim 32, wherein the two co-planar rings are characterized by a spiral shape.

36. (previously presented) The system of claim 31, further comprising a ground conductor layer disposed on a second surface of the circuit board parallel to the surface of the circuit board, whereby the ground conductor layer and the metallic diaphragm shield the two co-planar rings from AC-signals.

37. (original) The system of claim 31, wherein the processor includes a gain correction circuit, the gain correction circuit being configured to multiply a number representing the frequency by a correction factor.

38. (original) The system of claim 37, wherein the correction factor equals an initial zero-pressure frequency value divided by an ambient zero-pressure frequency value.

39. (original) The system of claim 31, wherein the processing circuit includes a counter circuit configured to determine the frequency of the filtered signal.

40. (original) The system of claim 39, wherein the counter circuit employs a frequency counting method.

41. (original) The system of claim 39, wherein the counter circuit employs a period averaging method.

42. (original) The system of claim 39, wherein the counter circuit employs a period averaging method that counts frequency pulses within a sampling period.

43. (original) The system of claim 42, wherein the period averaging method determines the frequency by solving the equation, frequency = Fref $*[(N_n - N_{n-1})/(M_n - M_{n-1})]$, wherein n is the sampling period, $N_n - N_{n-1}$ is a number of pulses counted in the sampling period, and $M_n - M_{n-1}$ is a number of clock periods occurring during sampling period n.

44. (original) The system of claim 43, wherein Fref is a constant.

45. (original) The system of claim 43, wherein Fref is a reference frequency.

46. (original) The system of claim 31, wherein the stimulus parameter is pressure.

47. (original) The system of claim 31, wherein the stimulus parameter is force.

48. (original) The system of claim 31, wherein the stimulus parameter is displacement.

49. (original) A method for calibrating a capacitive sensor used to measure a stimulus parameter, the method comprising:

providing a sensor including a capacitor transducer and an oscillator circuit, the capacitor transducer being characterized by a variable capacitance that varies in accordance with a change in the stimulus parameter;

determining a correction factor by comparing an initial condition to an ambient condition;

determining the frequency corresponding to the stimulus parameter during ambient conditions; and

correcting the stimulus parameter by multiplying the correction factor by the frequency, whereby a corrected frequency value is obtained.

50. (previously presented) The method of claim 49, wherein the step of determining further comprises the steps of:

obtaining an initial condition factory oscillation frequency value (f_0);

obtaining an initial condition ambient condition frequency value (f_1); and

dividing the initial condition factory oscillation frequency value by the initial condition ambient condition frequency value.

51. (original) The method of claim 50, wherein the initial condition factory oscillation frequency value is obtained when the sensor is configured in a zero stimulus state.

52. (original) The method of claim 50, wherein the initial condition ambient oscillation frequency value is obtained when the sensor is configured in a zero stimulus state.

53. (original) The method of claim 50, wherein the correction factor equals, $C = f_0/f_1$.

54. (original) The method of claim 53, wherein the corrected frequency equals, $f_C = C^* f_S$, f_S being the frequency corresponding to the stimulus parameter during ambient conditions.

55. (original) The method of claim 49, wherein the stimulus parameter is pressure.

56. (original) The method of claim 49, wherein the stimulus parameter is force.

57. (original) The method of claim 49, wherein the stimulus parameter is displacement.

58. (original) The method of claim 49, wherein the stimulus parameter is humidity.

59. (currently amended) A capacitive pressure sensor for measuring a stimulus parameter, the sensor comprising:

a circuit board including at least one metallic layer;

a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form a transducer capacitor characterized by a capacitance, the metallic diaphragm becoming substantially curved relative to the at least one metallic layer in response to a change in the stimulus parameter such that the capacitance changes in accordance with stimulus parameter changes; and

an oscillator circuit <u>disposed on the circuit board and</u> coupled to the transducer capacitor, the oscillator circuit being configured to generate a signal characterized by a frequency that changes in accordance with capacitance changes.

60. (original) A capacitive sensor for measuring a stimulus parameter, the sensor comprising:

a circuit board including at least one metallic layer;

a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form a transducer capacitor characterized by a capacitance, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in the stimulus parameter such that the capacitance changes in accordance with stimulus parameter changes;

a conductive ring disposed between the metallic diaphragm and the circuit board;

a pressure port assembly coupled to the conductive ring, whereby a cavity is formed between a pressure port and the metallic diaphragm; and

an oscillator circuit coupled to the transducer capacitor, the oscillator circuit being configured to generate a signal characterized by a frequency that changes in accordance with capacitance changes.

61. (original) A capacitive sensor for measuring a stimulus parameter, the sensor comprising:

a circuit board including at least one metallic layer;

a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form a transducer capacitor characterized by a capacitance, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in the stimulus parameter such that the capacitance changes in accordance with stimulus parameter changes;

at least one guard ring disposed within a thickness of the circuit board, the guard ring being adapted to reduce stray capacitance between the metallic diaphragm and the metallic layer; and

an oscillator circuit coupled to the transducer capacitor, the oscillator circuit being configured to generate a signal characterized by a frequency that changes in accordance with capacitance changes.

62. (currently amended) A capacitive sensor for measuring a stimulus parameter, the sensor comprising:

a circuit board including at least one metallic layer;

a metallic diaphragm coupled to the circuit board and juxtaposed to the metallic layer to thereby form a transducer capacitor characterized by a capacitance, the metallic diaphragm not including an attached metallic plate, the metallic diaphragm being adapted to move relative to the at least one metallic layer in response to a change in the stimulus parameter such that the capacitance changes in accordance with stimulus parameter changes; and

an oscillator circuit disposed on the circuit board and coupled to the transducer capacitor, the oscillator circuit being configured to generate a signal characterized by a frequency that changes in accordance with capacitance changes.